



Dr Jillian M. Petersen
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Main Research Areas

- Microbial symbioses, particularly between marine invertebrate animals and chemosynthetic bacteria
- Genomic and molecular basis of host-microbe interactions
- Ecology, evolution and development of marine symbioses
- In situ imaging of microbial identity and activity

Career

2020 – current	Associate Professor, Division of Microbial Ecology, University of Vienna
2016 – 2020	Assistant Professor (tenure track), Division of Microbial Ecology, University of Vienna
2015 – current	Head of WWTF Vienna Research Group for Young Investigators
2013 – 2015	Senior scientist, Symbiosis Department, Max Planck Institute for Marine Microbiology
2013	Maternity leave
2009 – 2013	Postdoctoral researcher, Symbiosis Group, Max Planck Institute for Marine Microbiology
2010 – 2011	Maternity leave
2003 – 2004	Undergraduate scientist, Advanced Wastewater Management Center, University of Queensland, Australia

Education

2009	Dr. rer. nat. University of Bremen and Max Planck Institute for Marine Microbiology, Bremen, Germany <i>Thesis title: "Diversity and Ecology of Chemosynthetic Symbioses in Deep-Sea Invertebrates"</i>
2006	Master of Science in Marine Microbiology, International Max Planck Research School of Marine Microbiology, Bremen, Germany Grade A (excellent)

2004 Bachelor of Science in microbiology, University of Queensland,
Brisbane, Australia
Grade point average 6.22 out of a possible 7.0 (6.0 = distinction)

Awards and Fellowships

2019 Elected to the International Board of the International Society for
Microbial Ecology (ISME)
2019 Elected to the Young Academy of the Austrian Academy of Sciences
2019 City of Vienna Award for Natural Sciences
2018 ERC Starting Grant
2015 Fellowship of the Robert Bosch Foundation's 'Fast Track' program for
outstanding women in science
2014 Vienna Research Group for Young Investigators, a start-up award
from the Vienna Science and Technology Fund
2013 ASLO Raymond L. Lindeman Award for an outstanding paper written
by a young aquatic scientist
2011 Wolf Vishniac Award for Young Investigators from the International
Society for Environmental Biogeochemistry
2007 Interridge Outstanding Student Paper Award, Interridge Theoretical
Institute: Biogeochemical Interaction at Deep-Sea Vents, Woods Hole
Oceanographic Institution, USA
Poster Prize, Gordon Research Conference Applied and
Environmental Microbiology, Mount Holyoke, USA

Research Grants

2019 Austrian Science Fund (FWF) doc.funds doctoral school on
Symbiosis (co-coordinator, total volume € 1,902,623)
2018 ERC Starting Grant (€ 1,499,561)
2017 Individual PhD fellowship for Sarah Zauner from the Austrian
Academy of Sciences (€ 126,000)
2016 Individual postdoc funding for Nathalie Elisabeth from the Region
Guadeloupe (€ 55,000)
2015 Bosch Foundation Fellowship (€ 15,000)
2014 Vienna Science and Technology Fund (WWTF) 'Vienna Research
Group' funding for an independent research group at the University of
Vienna (€ 1,600,000)
2012 Individual doctoral thesis funding for Lizbeth Sayavedra from the
German Academic Exchange Service (DAAD) (€ 48,000)

Selected Presentations

2021 ALSO 20201 Aquatic Sciences Meeting
Invited speaker
Southern Denmark University Biology Faculty Seminar Series
Invited speaker
EMBL Planetary Biology Lecture Series
Invited speaker
2020 12th Annual Meeting of the Austrian Society for Molecular Bioscience
and Biotechnology
Keynote speaker
2019 21st International Congress on Nitrogen Fixation, Wuhan, China
Plenary speaker
Gordon Research Conference Applied and Environmental
Microbiology, South Hadley, USA

- Invited speaker**
Gordon Research Conference Animal-Microbe Symbioses, Mount Snow, USA
- Invited speaker**
Vienna Graduate School of Population Genetics
- 2018 **Invited seminar speaker**
MIMAS-II Symposium on Microbial Interactions in Marine Systems, Greifswald Germany
- Invited speaker**
Gordon Research Conference Microbial C1 Metabolism, USA –
- Invited speaker**
Dutch Microbiology Society (KNVM) Spring Meeting, Arnhem –
- Invited speaker**
Department of Ecology and Evolution, University of Salzburg, Austria
- 2017 **Invited speaker**
3rd Institute of Oceanography, Xiamen, China
- Invited speaker**
International CRC Workshop ‘Survival Artists’, Marburg Germany
- Keynote speaker**
Society for Aquatic Microbial Ecology (SAME), Zagreb Croatia
- Keynote speaker**
6th International Symposium on Chemosynthesis-Based Ecosystems, Woods Hole USA
- Keynote speaker**
Annual Conference of the German Association for General and Applied Microbiology, Würzburg Germany
- Invited speaker**
Annual Meeting of the Society for Integrative and Comparative Biology (SICB), New Orleans USA
- 2016 **Invited speaker**
ISME Meeting, Montreal Canada
- Session coordinator and speaker**
ASM Microbe, Boston USA
- Invited speaker**
Invited seminar at the Department of Microbiology, Radboud University, Nijmegen The Netherlands
- 2015 **Invited speaker**
EMBO Workshop on Microbial Sulfur Metabolism, Helsingor Denmark
- Invited speaker**
International Symbiosis Society Meeting, Lisbon Portugal
- 2014 **Invited speaker**
Vienna Biocenter PhD Symposium, Austria
- Invited speaker**
Lyell Meeting of the Geological Society of London, England
- 2013 **Invited speaker**
Aquatic Sciences Meeting of the Association for the Sciences of Limnology and Oceanography, New Orleans USA
- Acceptance speech for the Lindeman award during plenary session**
- 2012 Canadian Institute for Advanced Research, Integrated Microbial Diversity program annual meeting, Quebec City Canada
- Invited speaker**
- 2011 20th International Society for Environmental Biogeochemistry Meeting, Istanbul Turkey
- Invited speaker**
- 2009 American Society for Microbiology (ASM) General Meeting, Philadelphia USA
- Invited speaker**
- 2008 European Geosciences Union (EGU) General Assembly, Vienna Austria

2007

Oral presentation

Annual Conference of the German Association for General and Applied Microbiology, Osnabrück Germany

Oral presentation

Supervision and Mentoring

Current:

Benedict Yuen (Postdoc)
Margaret Vogel (Postdoc)
Sarah Zauner (PhD)
Jay Osvatic (PhD)
Cristina Alcaraz (PhD)
Marta Sudo (PhD)
Jennifer Windisch (MSc)
Dylan Simon (MSc)
Lukas Leibrecht (MSc)

Past (with current affiliation for PhD students and postdocs I mentored):

Julia Polzin (Postdoc, now Advanced Analyst at Boehringer Ingelheim Vienna)
Ulisse Cardini (Postdoc, now tenured Group Leader at Zoological Station Naples)
Nathalie Elisabeth (Postdoc, now Project Scientist at Lawrence Berkeley National Laboratory)
Luciana Raggi (PhD, now Researcher at Universidad Michoacana de San Nicolás de Hidalgo, Mexico)
Judith Zimmermann (PhD, now Microbiology Laboratory Manager, BASF Ludwigshafen)
Lizbeth Sayavedra (PhD, now Postdoc at the Quadram Institute, Norwich)
Adrien Assié (PhD, now Postdoc at Baylor College of Medicine, Houston)
Rebecca Ansoorge (PhD, now Postdoc at the Quadram Institute, Norwich)
Judith Zimmermann (MSc)
Lizbeth Sayavedra (MSc)
Laura Gallego Valle (MSc)
Anna Kemper (MSc)
Miguel Angel Gonzales Porras (MSc)
Bertram Hausl (MSc)
Nora Grossschmidt (MSc)
Anastasia Svavilnaya (MSc)
Nataliia Solncteva (MSc)
Alexandra Belitz (internship)
Alaina Weinheimer (internship)
Ariadna Alcalde Martinez (internship)
Antonia Ilkova (internship)

Teaching and Outreach

- 2015 – current: Teaching in seminars, lectures and practical courses at the Bachelors (German) and Masters (English) level, University of Vienna
- 2015 – current: Faculty member in the Vienna Doctoral School ‘Molecules of Life’
- Keynote speaker at Darwin Day 2018, a public outreach event for approx. 1000 high school students from northern Germany, organized by the University of Kiel Zoological Museum
- Keynote speaker and discussion panel member, public outreach event ‘Microbiome and Environment’ at the Natural History Museum of Vienna, 2018

- January 2012 – August 2015, faculty member of the International Max Planck Research School for Marine Microbiology (MarMic)
 - 2013 and 2014, Lecturer for the Module ‘Symbiosis’ in the MarMic school
- Featured in a number of newspaper articles in Standard, Presse, Kronen Zeitung, Wiener Zeitung, Austrian national news
- Featured on the German TV show ‘Buten un Binnen’ (August 2011)
- Invited lectures for courses on marine microbiology, hydrothermal vent biology
- Invited lecture on deep-sea research for members of the Bremen Chamber of Commerce (Bremen, 2012)
- Invited lecture for science delegates of the European Union (Bremen, 2007)

Professional services

- Member of the Board (Kuratorium), Austrian Science Fund (FWF)
- Member, International Board International Society for Microbial Ecology (ISME)
- Inaugural Chair of the ISME Early Career Scientist Committee
- Organizing Committee of ISME Virtual Summit #UnityInDiversity (<https://www.isme-microbes.org/unity-diversity>)
- Co-chair of the working group ‘Symbiotic Interactions’ of the German Society for General and Applied Microbiology
- Chair, International Workshop on Microbial Sulfur Metabolism (WMSM), Vienna 2018
- Co-organizer of Satellite Meeting “Chemotrophic symbiosis in the genomic era” for the 8th International Symbiosis Society Meeting, Summer 2015
- Editor, mSystems, an American Society for Microbiology Journal (2015 – 2021)
- Editor, Biological Bulletin
- Senior Editor, ISME Journal
- Peer-review for Science, Current Biology, PNAS, Nature Microbiology, ISME Journal, Molecular Ecology, Environmental Microbiology, Microbiome, PLoS One, Current Microbiology, Genome Biology and Evolution, Biological Bulletin, Symbiosis, Biogeosciences Discussions, and others
- Proposal reviews for the Schmidt Ocean Institute, French National Research Council (ANR), National Science Foundation (NSF), German Research Foundation (DFG)
- Panel member, Portuguese Science and Technology Fund (FCT)
- Review panel member, Schmidt Ocean Institute
- Member of the ‘Gutachter Panel Forschungsschiffe’ a joint panel of the German Research Foundation, Ministry of Science and Education, and Helmholtz Association responsible for reviewing applications for German research vessels
- Member of the judging committee for the MARUM Research Award for Marine Sciences
- Member of the MPI Bremen Employees Council from 2006 – 2010

Publications

Author on 28 papers in peer-reviewed journals (including papers as first or last author in Nature, Nature Microbiology, eLife, PNAS). Published papers have received 1183 citations; H-index 18 (Google Scholar).

*Corresponding author

§Equal contribution

Preprints and submitted manuscripts

2. Ansorge R, Romano S, Sayavedra L, Rubin-Blum M, Gruber-Vodicka H, Scilipoti S, Molari M, Dubilier N, **Petersen JM***. The hidden pangenome: comparative genomics reveals pervasive diversity in symbiotic and free-living sulfur-oxidizing bacteria. *BioRxiv* (2020).

1. Sayavedra L, Ansorge R, Rubin-Blum M, Leisch N, Dubilier N, **Petersen JM***. Horizontal acquisition followed by expansion and diversification of toxin-related genes in deep-sea bivalve symbionts. *BioRxiv* (2019): 605386.

Peer-reviewed publications

28. Osvatic JT[§], Wilkins LGE[§], Leibrecht L, Leray M, Zauner S, Polzin J, Camacho Y, Gros O, van Gils J, Eisen JA, **Petersen JM*[§]**, Yuen B[§] (2021). Global biogeography of chemosynthetic symbionts reveals both localized and globally-distributed symbiont groups. *Proceedings of the National Academy of Sciences, USA* 118(29) doi: 10.1073/pnas.2104378118

27. Leray M, Wilkins LG, Apprill A, Bik HM, Clever F, Connolly SR, De Leon ME, Duffy JE, Ezzat L, Gignoux-Wolfsohn S, Herre EA, Kaye JZ, Kline DI, Kueneman JG, McCormick MK, McMillan O, O'Dea A, Pereira TJ, **Petersen JM**, Petticord DF, Torchin ME, Vega Thurber R, Videvall E, Wcislo WT, Yuen B, Eisen, JA (2021). Natural experiments and long-term monitoring are critical to understand and predict marine host–microbe ecology and evolution. *PLoS Biology*, 19(8), e3001322 doi: 10.1371/journal.pbio.3001322

26. **Petersen JM***, Yuen B (2021) The symbiotic ‘all-rounders’: Partnerships between marine animals and chemosynthetic nitrogen-fixing bacteria. *Applied and Environmental Microbiology* 87(5), e02129-20 doi: 10.1128/AEM.02129-20

25. Huang Z, **Petersen JM**, Shao Z (2021) A novel SAR324 bacterium associated with abalone, *Haliotis diversicolor*. *Aquaculture Research* 52(5), 1945-1953 doi: 10.1111/are.15043

24. Huang Z, **Petersen JM**, Martijn J, Ettema TJ, Shao Z (2020). A novel alphaproteobacterium with a small genome identified from the digestive gland of multiple species of abalone. *Environmental Microbiology Reports* 12: 387–395 doi:10.1111/1758-2229.12845

23. Yuen B, Polzin J, **Petersen JM*** (2019). Organ transcriptomes of the lucinid clam *Loripes orbiculatus* (Poli, 1791) provide insights into their specialized roles in the biology of a chemosymbiotic bivalve. *BMC Genomics* 20: 1-14 doi: 10.1186/s12864-019-6177-0

22. Cardini U, Bartoli M, Lee R, Luecker S, Mooshammer M, Polzin J, Weber M, **Petersen JM*** (2019). Chemosymbiotic bivalves contribute to the nitrogen budget of seagrass ecosystems. *ISME Journal* 13: 3131-3134 doi: 10.1038/s41396-019-0486-9

21. Romero Picazo D, Dagan T, Ansorge R, **Petersen JM**, Dubilier N, Kupczok A (2019). Horizontally transmitted symbiont populations in deep-sea mussels are genetically isolated. *ISME Journal* 13: 2954-2968 doi: 10.1038/s41396-019-0475-z

20. Ansorge R, Romano S, Sayavedra L, Kupczok A, Tegetmeyer HE, Dubilier N, **Petersen JM*** (2019). Diversity matters: Deep-sea mussels harbor multiple symbiont strains. *Nature Microbiology* 4: 2487-2497 doi: 10.1038/s41564-019-0572-9

19. Assié A, Leisch N, Meier DV, Gruber-Vodicka H, Tegetmeyer HE, Meyerdierks A, Kleiner M, Hinzke T, Joye SB, Saxton M, Dubilier N, **Petersen JM*** (2019). Horizontal acquisition of a patchwork Calvin cycle by symbiotic and free-living Campylobacterota (formerly Epsilonproteobacteria). *ISME Journal* 14: 104–122 doi: 10.1038/s41396-019-0508-7

18. **Petersen JM***, Osvatic J (2018). Microbiomes in natura: The importance of invertebrates for understanding the natural variety of animal-microbe interactions. *mSystems* 3: e00179-17 doi: 10.1128/mSystems.00179-17

17. **Petersen JM***, Kemper A, Gruber-Vodicka H, Cardini U, van der Geest M, Musmann M, Bulgheresi S, Seah BKB, Chakkiath PA, Herbold C, Liu D, Belitz A, Weber M (2016). Chemosynthetic symbionts of marine invertebrate animals are capable of nitrogen fixation. *Nature Microbiology* 2: 16195 doi:10.1038/nmicrobiol.2016.195

16. Ponnudurai, RP, Kleiner M, Sayavedra L, **Petersen JM**, Moche M, Otto A, Becher D, Takeuchi T, Satoh N, Dubilier N, Schweder T, Markert S (2016). Metabolic and physiological interdependencies in the *Bathymodiolus azoricus* symbiosis. *ISME Journal* 11: 463-477 doi:10.1038/ismej.2016.124

15. Assie A, Borowski C, van der Heijden K, Raggi L, Geier B, Leisch N, Schimak MP, Dubilier N, **Petersen JM*** (2016) A specific and widespread association between deep-sea *Bathymodiolus* mussels and a novel family of Epsilonproteobacteria. *Environmental Microbiology Reports* 8: 805-813 doi: 10.1111/1758-2229.12442

14. Breusing C, Biastoch A, Drews A, Metaxas A, Jollivet D, Vrijenhoek RC, Bayer T, Melzner F, Sayavedra L, **Petersen JM**, Dubilier N, Schilhabel MB, Rosenstiel P, Reusch TBH (2016). Biophysical and population genetic models predict presence of "phantom" stepping stones connecting Mid-Atlantic Ridge vent ecosystems. *Current Biology* 26: 1 – 11.

13. Sayavedra L, Kleiner M, Ponnudurai R, Wetzel S, Pelletier E, Barbe V, Shoguchi E, Satoh N, Reusch TBH, Rosenstiel P, Schilhabel MB, Becher D, Schweder T, Markert S, Dubilier N, **Petersen JM*** (2015) An abundance of toxin-related genes in the genome of beneficial symbionts from deep-sea hydrothermal vent mussels. *eLife* e07966

12. Zimmermann J, Lott C, Weber M, Ramette A, Bright M, Dubilier N, **Petersen JM*** (2014) Dual symbiosis with co-occurring sulfur-oxidizing symbionts in vestimentiferan tubeworms from a Mediterranean hydrothermal vent. *Environmental Microbiology* 16: 3638-3656 doi: 10.1111/1462-2920.12427



This paper was featured on the cover of the December 2014 issue of Environmental Microbiology

11. Jan C, **Petersen JM[§]**, Werner J[§], Teeling H[§], Huang S, Glöckner FO, Golyshina OV, Dubilier N, Golyshin PN, Jebbar M and Cambon-Bonavita M-A (2014) The gill chamber epibiosis of deep-sea shrimp *Rimicaris exoculata*: an in-depth metagenomic investigation and discovery of Zetaproteobacteria. *Environmental Microbiology* 16: 2723-2738 doi: 10.1111/1462-2920.1240

10. Raggi L, Schubotz F, Hinrichs K-U, Dubilier N, **Petersen JM*** (2013) Bacterial symbionts of *Bathymodiolus* mussels and *Escarpi* tubeworms from Chapopote, an asphalt seep in the

southern Gulf of Mexico. *Environmental Microbiology* 15: 1969–1987 doi: 10.1111/1462-2920.12051

9. Kleiner M, Petersen JM, Dubilier N (2012) Convergent and divergent evolution of metabolism in sulfur-oxidizing symbionts and the role of horizontal gene transfer. *Current Opinion in Microbiology* 15:621–631 doi: 10.1016/j.mib.2012.09.003

8. Petersen JM*, Wentrup C, Verna C, Knittel K, Dubilier N (2012) Origins and evolutionary flexibility of chemosynthetic symbionts from deep-sea animals. *The Biological Bulletin*. 223: 123–137.

7. van der Heijden K, Petersen JM, Dubilier N, Borowski C (2012) Gene flow across the equatorial belt on the Mid-Atlantic Ridge in chemosynthetic bivalves and their symbionts. *PLoS One* 7(7): e39994. doi:10.1371/journal.pone.0039994.

6. Petersen JM§, Zielinski FU§, Pape T, Seifert R, Moraru C, Amann R, Hourdez S, Girguis PR, Wankel SD, Barbe V, Pelletier E, Fink D, Borowski C, Bach W, and Dubilier N (2011) Hydrogen is an energy source for hydrothermal vent symbioses. *Nature* 476: 176–180 doi:10.1038/nature10325



This paper was featured on the cover of the August 11th issue of Nature and reported in numerous German and international newspapers such as Die Zeit, Frankfurter Allgemeine Zeitung, SpiegelOnline, msnbc, and in German national and regional television in the ZDF Heute Journal and the RadioBremen Buten un Binnen

5. Hügler M, Petersen JM, Dubilier N, Imhoff JF, Sievert SM (2011) Pathways of carbon and energy metabolism of the epibiotic community associated with the vent shrimp *Rimicaris exoculata*. *PLoS One* 6, doi:e1601810.1371/journal.pone.0016018.

4. Petersen JM, Ramette A, Lott C, Cambon-Bonavita MA, Zbinden M, and Dubilier N (2010) Biogeography of filamentous gamma- and epsilonproteobacterial epibionts on the shrimp *Rimicaris exoculata* from four Mid-Atlantic Ridge hydrothermal vent fields. *Environmental Microbiology* 12: 2204–2218 doi: 10.1111/j.1462-2920.2009.02129.x

3. Petersen JM and Dubilier N (2010) Symbiotic methane oxidizers. In: **Microbiology of Hydrocarbons, Oils, Lipids and Derived Compounds**. Ed. Kenneth N. Timmis. Springer.

2. Perner M, Petersen JM, Zielinski FU, Gennerich H-H, Seifert R (2010) Geochemical constraints on the diversity and activity of H₂-oxidizing bacteria and archaea in diffuse hydrothermal fluids from a basalt- and an ultramafic-hosted vent. *FEMS Microbiology Ecology* 74: 55-71 doi: 10.1111/j.1574-6941.2010.00940.x

1. Petersen JM and Dubilier N (2009) Methanotrophic symbioses in marine invertebrates. *Environmental Microbiology Reports* 1: 319–335 doi: 10.1111/j.1758-2229.2009.00081.x

Additional Publications

4. **Petersen JM*** (2016) Dark energy on your dinner plate. *Current Biology* 26: R1277-R1279.

3. Cordes EE, Michel APM, **Petersen JM**, Wankel SD, Ansorge R, Girguis PR, Leisch N, Smart C, Roman C, Wetzel S, Vidoudez C (2016) ROV Hercules investigates brine lakes on the bottom of the ocean. *Oceanography* 29: 30 – 31.

2. **Petersen JM***, Dubilier N (2014) Gene swapping in the dead zone. *eLife* 3: e04600.

1. Fisher CR, Baums IB, Demopoulos AWJ, Dubilier N, Girard F, Kovacs K, Kurman M, Mentch J, **Petersen JM**, Saunders M, Sayavedra L, Sibert RJ, Vohsen S (2015) Ecosystem Impacts of Oil and Gas Inputs to the Gulf of Mexico (ECOGIG). *Oceanography* 28: 28 – 29.